REMARKS

The Office Action mailed September 20, 2005 has been carefully considered. Reconsideration in view of the following remarks is respectfully requested. Claims 1, 3, 4, 7 – 9, 11 – 13, 15, 16, 18, and 19 are pending in the application. Claims 1, 3, 4, 7 – 9, 11 – 13, 15, 16, 18, and 19 have been rejected. Claims 1, 9, and 13 have been amended. Support for the amendment is found in the specification, claims, and drawings as originally filed. Applicants submit, therefore, that the amendments do not add new matter.

Rejection(s) Under 35 U.S.C. § 103 (a)

Claims 1, 3, 4, 7 – 9, 11 – 13, 15, 16, 18, and 19 were rejected under 35 U.S.C. § 103(a) as unpatentable over Christopher Tarr et al. (U.S. Pat. No. 6,084,587) in view of Jianmin Zhao (U.S. Pat. No. 5,889,528).

Applicants respectfully submit that claim 1, as amended is not rendered obvious by Tarr in view of Zhao. Amended claim 1 includes the following limitations.

> A method, comprising:
> sensing a manipulation of an articulatable object configured to be coupled to a host computer system that includes a graphical environment;
> updating data values associated with at least one of a displayed orientation and a displayed shape of a graphical image in the graphical environment in relation to the sensed manipulation;
> changing a relationship between the sensed manipulation and the at least one of the displayed orientation and the displayed shape of the graphical image based on a simulated interaction of the graphical image with a graphical object; and
> calculating one of the displayed orientation and the displayed shape of the graphical image, <u>wherein calculating includes using a quadratically converging and linearly scalable constraint solver employing a ridge regression technique.</u>

(Amended claim 1) (Emphasis added)

Applicants respectfully submit that neither Tarr not Zhao, alone or in combination include this limitation. Specifically, Zhao discloses

"In FIG. 3, k is used as a counter for the number of iterations performed. Initially, k is set to 0 (310), and .theta..sub.k represents the configuration of the current iteration for finding .theta..sub.g. At each iteration, the invention determines whether to terminate (320). Termination criteria may vary. For example, if the end effectors of .theta..sub.k are determined to be positioned within a threshold distance from goal positions g or if the end effectors are determined to be as close as possible to the goal positions, the goal configuration .theta..sub.g is set to .theta..sub.k (330), and the iterative process terminates."

(Col. 3, lines 33 – 44)

"The quasi-Newton minimization method simplifies the search by locally approximating the composite function from a configuration .theta..sub.k to error value F(e.sub.k) with a quadratic function at the specific point representing configuration .theta..sub.k in the n-dimensional angle space. The direction from the point .theta..sub.k towards .theta..sub.g can be determined by:

.DELTA..theta.=-H.sub..theta. (F).sup.-1 .gradient..sub..theta. (F)›EQ 1!

References such as WILLIAM H. PRESS, et al., NUMERICAL RECIPES in C: THE ART of SCIENTIFIC COMPUTING 425-430 (1995), incorporated by reference, discuss the quasi-Newton method in greater detail. EQ 1 indicates that finding a direction .DELTA..theta..sub.k from a configuration .theta..sub.k requires calculation of the inverse of the Hessian H.sub..theta. (F) of error function F with respect to .theta. (calculated by taking the second partial derivative of F with respect to .theta.), as well as the gradient of the error function F with respect to .theta."

(Col 3, line 66 – Col 4, line 17)

Applicants submit that Zhao does not disclose the limitation of a linearly scalable "constraint solver". In contrast, Zhao teaches a quasi-Newton unconstrained optimizer as evidenced by Zhao's use of minimal co-ordinates to maintain constraints. Such techniques are not quadratically convergent. Therefore, Zhao does not include the limitation of a quadratically converging and linearly scalable constraint solver as claimed.

Moreover, applicants have amended the claim to include the limitation of "employing a ridge regression technique". Such limitation is not disclosed or suggested by Tarr.

For these reasons applicants respectfully submit that claim 1 as amended is not rendered obvious by Tarr or Zhao, alone or in combination.

Given that claims 9 and 13 include the limitations of a "linearly scalable" constraint solver and "employing a ridge regression technique", applicants respectfully submit that claims 9 and 13 are likewise patentable over the cited references. Given that claims 3, 4, 7, and 8, claims 11 and 12, and claims 15, 16, 18, and 19, depend, directly or indirectly, from claims 1, 9, and 13, respectively, applicants respectfully submit that claims 3, 4, 7, 8, 11, 12, 15, 16, 18, and 19 are, likewise, patentable over Tarr in view of Zhao.

Conclusion

In view of the preceding discussion, Applicants respectfully urge that the claims of the present application define patentable subject matter and should be passed to allowance.

If the Examiner believes that a telephone call would help advance prosecution of the present invention, the Examiner is kindly invited to call the undersigned attorney at the number below.

Please charge any additional required fees, including those necessary to obtain extensions of time to render timely the filing of the instant Amendment and/or Reply to Office Action, or credit any overpayment not otherwise credited, to our deposit account no. 50-1698.

Respectfully submitted,

THELEN REID & PRIEST, L.L.P.

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Thomas Van Zandt
Reg. No. 43,219

Thelen Reid & Priest LLP
P.O. Box 640640
San Jose, CA 95164-0640
Tel. (408) 282-1855
Fax. (408) 287-8040